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AN INTERESTING FOOD HABIT OF THE PLESIOSAURS.

BY S. W. WILLISTON, STATE UNIVERSITY, LAWRENCE.

In the report on the geology of Kansas in the First Biennial Report of the State Board of Agriculture, page 62, by Professor Mudge, occurs the following: "In the Plesiosaurs we found another interesting feature showing an aid to digestion, similar to many living reptiles and some birds. This consisted of well-worn siliceous pebbles, from one-fourth to one-half an inch in diameter. They were the more curious, as we never found such pebbles in the chalk or shales of the Niobrara." As a member of Professor Mudge's party, I have a very distinct recollection of the different specimens which afforded these pebbles. The first, found by myself, had, scattered among the ribs, a quart or more of the stones. The others gave a less number, but they were found imbedded in the matrix surrounding the ribs. If my memory is correct, all of the specimens belonged to the genus *Polycotylus*, and were of medium size. The conclusion that the pebbles had been in the stomach of the reptiles was irresistible, and was all the more interesting from the fact, as stated by Mudge, that such stones were entirely foreign, otherwise, to the chalk.

A little over a year ago, the University museum received from Mr.———, of Ellsworth, Kas., a large plesiosaur vertebra and, with it, a rounded pebble, with the request for information concerning both. At the first opportunity, I visited Ellsworth, and, in company with Mr.———, examined the locality whence they had been obtained. the bones were found in a poor state of preservation, from the effects of frost, but, by carefully digging over the loosened shale and soil in which they were contained, we succeeded in securing about 125 of the pebbles, together with a number of characteristic bones. Some of the pebbles were attached by the original soft limestone matrix to the ribs and thoracic vertebræ, so that that there could not be a shadow of doubt of the contemporaneity of deposition. So remarkable had these strange pebbles appeared to those persons who had visited the locality, that many had been carried off as keepsakes, and were called "gizzard stones." It was estimated that, first and last, but little less than a peck of them had been found.

The saurian is one of the largest of the order, measuring, when alive, probably not less than 50 feet. Its specific, or even generic, determination is difficult at present, owing to our lack of knowledge of the allied forms. I believe, however, that it will prove to be a *Trinacromerum*. The pebbles are, all of them, extremely hard, consisting almost wholly of silica. They vary in weight from less than 1 gram to 170 grams, and in their greatest diameters from about one-fourth of an inch to over three inches. In color they are all conspicuous, either white, black, or pink, and all show a great amount of abrasion. The smaller ones have been worn into more or less perfect ellipsoids, and all are quite smooth. The larger ones have rounded angles, indicating a less amount of abrasion.

The pebbles undoubtedly formed a part of the contents of the stomach of the saurian, and had as certainly been gathered up by the animal from the distant beaches of the Benton sea. Professor Mudge states that many reptiles have this habit of swallowing stones; but in this, I think, he was in error. Certainly no other reptiles of the Kansas cretaceous have ever presented any evidence whatever of a similar habit, and, I think, among living reptiles few, except the crocodiles, are known to do so. The reptilian stomach never presents the strong, muscular structure of the gallinaceous birds, which thus use hard substances as an aid to digestion.

At first sight, it will seem remarkable that so monstrous an animal could have

retained in its alimentary canal solid objects so small as are some of these pebbles. But it is known that the crocodiles have a peculiarly small pyloric orifice, wholly preventing the passage of solid bodies, and all such, when taken into the stomach, whether bones or stones, must necessarily be digested, or worn down to an extremely small size, before passing into the intestinal canal. In this respect the pebbles show conclusively a similar disposition of the parts in the plesiosaurs. The food of the plesiosaurs must necessarily have been, from the comparatively small size of the mouth and the absence of any special means to aid in deglutition, the smaller animals that abounded in or upon the water, and this fact may perhaps account for the need of a more active digestion. Certainly nothing short of a small stone quarry would have given material aid to the digestive forces of the mosasaurs.

Not the least interesting fact connected with these pebbles is the indication they present of a color sense on the part of the reptiles, or, at least, that they selected the most conspicuous ones. It has been suggested that the stones might have received their shape from the action of the water, and that they, hence, need not have been long in the animal's stomach. This, however, is highly improbable; there is too much uniformity of shape among the smaller ones to have been caused by the action of water. Furthermore, it would have been hardly possible for the animal to have picked up such small stones as many of them are, and it is very evident that the stones were not accidentally swallowed. It is very probable that the pebbles originally were nearly the size of one's fist.

Yet more interesting is the light that is thrown upon the geography of the Benton sea at the time of the animal's existence. The red quartzite is apparently identical with that from Sioux City, and it is Professor Haworth's opinion that they all came from this region, or the region of the Black Hills. This is interesting both as indicating the shore lines at that time and the roving propensities of the animals.

THE DESCENT OF FACIAL EXPRESSION.

BY ALTON H. THOMPSON, TOPEKA, KAS.

It is not a very flattering reflection, perhaps, that the major part of our boasted human nature is animal in its origin, development, and leading characteristics. We talk loftily of our elevation and superiority, and boast of the wonderful things our species has done, and of our wonderful intellectual accomplishments; and they are wonderful, but by a measure we do not like to apply—*i. e.*, by comparison with the greater line of animal ancestry which lies so close at our backs, rather than with the briefer human lines since our emergence from the animal stage. It is because we are so nearly animal yet that our advancement is, in many respects, so wonderful. We admit that our physical organization is entirely animal, and that our moral nature is largely animal yet in its instincts; for it has not thrown off the thralldom it yet endures, of the long æons of savagery and animalism from which we have but lately emerged. Indeed, the brief historic period has done but little to release us from the savage influences of our prehistoric ancestry. By special effort, perhaps, under the powerful influence of religious or other emotions, some few minds have been emancipated from this slavery completely, and others again but in part. Some of these become the pilots of their race in their struggle toward a higher and better life. These are the saviors of mankind, which are lifting the race upward into a higher moral atmosphere. But the task is Herculean, for the legacy of primitive morals is continually dragging it backward into the mire. But intellectually we are,